Heterobilharzia Americana FAQ

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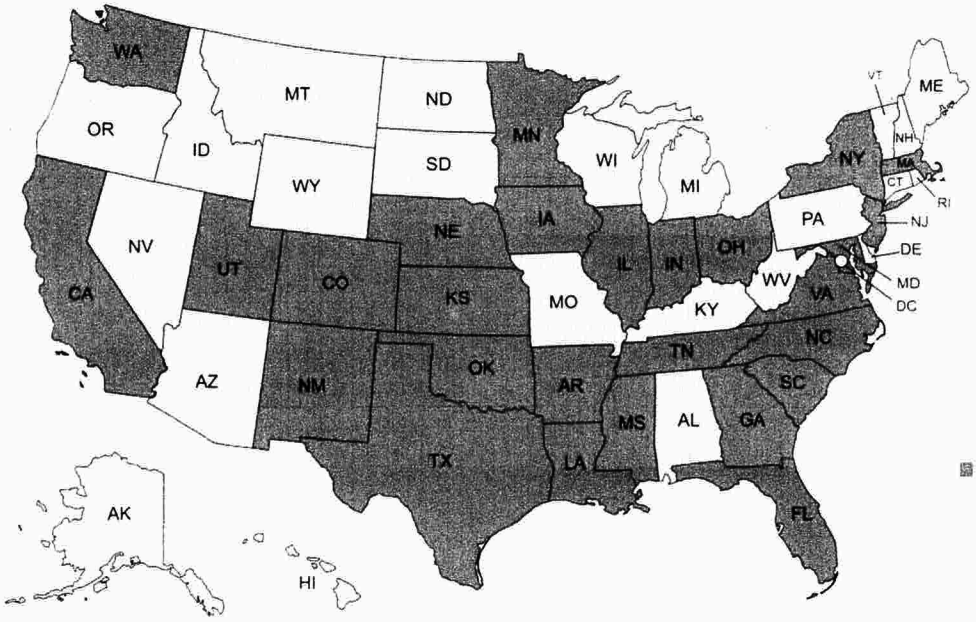
1. **What is *Heterobilharzia americana*?**
   Heterobilharzia americana is a fluke parasite that is the cause of canine schistosomiasis Dogs contract this infection during time spent in freshwater. It previously was thought to mostly affect dogs living in the southern and Gulf Coast state regions of the country. However, recently the infection has been documented in dogs in many other parts of the country, including in dogs without a known travel history to known affected areas. See the figure below in which states colored in red have dog(s) that have tested positive for infection as of 2024 (image created by mapchart.net).



2. **How does a dog become infected?**
   A dog becomes infected during time spent in infected freshwater, when an immature life stage of the parasite (cercariae) penetrates the skin. The parasite migrates through the lungs and liver, until maturing and mating inside the mesenteric veins of the dog. Eggs

are then released causing granulomatous inflammation within the intestines, liver, and other organs in the body. It takes about three months from the time of infection before a dog will shed eggs in the feces. Eggs are then shed back into the environment when a dog defecates. The eggs will hatch upon contact with water and will seek out a freshwater snail (intermediate hosts) to penetrate for the next part of the life cycle. Once the next stage of the life cycle is complete within the freshwater snail, the immature life stage (cercariae) is then released into the water and seeks a host (dog, raccoon, etc.) of which to penetrate the skin. The life cycle will then start all over again.

Therefore, to our best understanding, dogs can only become infected by spending time (wading, swimming, cooling down) in freshwater sources (ponds, lakes, streams, etc.). Freshwater snails must live in/around the water source to maintain the infection. Historically, the only freshwater snail known to be able to serve as the intermediate host of the parasite was limited to the southern and Gulf Coast States. Recently, another freshwater snail intermediate host was found connected to an outbreak of dogs in Moab, Utah. This other freshwater snail host has a larger geographic distribution, suggesting that infection can occur in parts of the country previously thought to be free of infection with this parasite.

At present, Labrador Retrievers are over-represented as a breed in the population of infected dogs. It is suspected that this is due to a higher-risk lifestyle with regards to contact with freshwater. However, **any breed** can be infected with this parasite if time is spent in contaminated water. It is estimated that greater than 50% of dogs will spend time swimming in their lifetime. Further, dogs owners will travel with their dogs more than ever before.

3. **How is a dog diagnosed with infection?**
   It takes approximately 3 months from the time that a dog is infected before a fecal test can be positive. The egg of this parasite is too heavy to readily be seen on standard fecal flotation performed as part of wellness/preventative care for dogs, therefore it is not seen on regular fecal testing. **Diagnosis requires either performing a fecal sedimentation test or a PCR for *Heterobilharzia americana***. Recent literature from veterinary radiologists and internists in Texas have described characteristic changes seen within the intestines, liver, and abdominal lymph nodes of infected dogs. This knowledge has increased collective awareness of the infection and led to earlier diagnosis in many dogs.

4. **What types of problems does the infection cause in dogs?**
   Infected dogs may have no symptoms for a period or may be critically ill at the time a diagnosis is made. Symptoms may include lethargy, weight loss, decreased appetite, vomiting, or changes in thirst or urination. The parasite can cause severe inflammation in the intestines and liver, and may lead to protein losing enteropathy, poor body condition, emaciation, or liver failure. There are reports of dogs who have developed cancer (lymphoma) because of infection. Dogs may have changes on their lab work

including an elevated eosinophil count, liver enzymes, or blood calcium levels. They may experience decreased blood proteins or cholesterol. Some dogs may experience protein loss in their urine.

5. **Can humans get this infection?**
   This infection is not directly transmitted between dogs and humans. Humans can get "swimmer's itch," a self-limiting dermatitis when swimming in water contaminated with cercariae. However, schistosomiasis is a significant cause of morbidity and mortality in humans who live in underdeveloped parts of the world. Human schistosomiasis is on the World Health Organization's list of neglected tropical diseases. Much of what we have done to treat dogs with this infection has been extrapolated from the work done in humans with this infection. https://www.who.int/news-room/fact-sheets/detail/schistosomiasis

6. **How is a dog treated for infection?**
   Unfortunately, there is much yet to be determined about how to best treat this infection. Currently, it is recommended to treat infected dogs with a combination of several doses of fenbendazole and a high dose of praziquantel. Frequently, dogs may experience side effects of these drugs during treatment (nausea, vomiting, etc.) and treatment can be very expensive. Frequently, a second treatment course is administered to clear the infection in symptomatic dogs. It is unknown if a lower dose or total number of doses can be administered either as the second dose for infected dogs or for treatment of asymptomatic dogs. Standard monthly preventatives that contain heartworm and intestinal parasite preventative medications are not thought to be protective against infection with *Heterobilharzia americana*. It is unknown if dogs would develop any sort of immunity after infection. Therefore, the only way of protecting a dog against infection is keeping them out of infected water sources. Currently, there is not yet a way of testing the water for presence of the parasite.

7. **If I have an infected dog, can my other dogs become infected?**
   Commonly, housemates of infected dogs are also found to have the infection. However, it is important to note that the infection is not directly transmitted dog to dog, as the parasite must complete part of the life cycle outside of the dog in the freshwater snail. There are many yet unanswered questions about the epidemiology of this parasite and we must better understand more about households with multiple infected dogs.

8. **How familiar are veterinarians with this infection?**
   Veterinarians learn about many infections during their training but will be most familiar with infections that are known to be present in the geographic region in which they practice. As this infection was previously thought to be limited to the southern and Gulf Coast states for such a long period of time, most veterinarians in other parts of the country would not consider or be familiar with this infection. Recent outbreaks in new parts of the country (Moab, Utah and southern California) as well as the discovery of the new intermediate snail host have documented the spread of this infection to other parts

of the country. There is clearly a need to increase awareness of this infection to all veterinarians who care for dogs in their practice. Further, veterinary medical professionals should include swimming or water exposure in standard histories obtained on patients for both wellness and sick dog visits.

9. **Can you give me medical advice about my dog who is infected?**
   Legally, we are not allowed to medical advice directly to owners about their dogs. Doing so requires a valid veterinarian-client-patient relationship which is only allowable for patients seen directly at Texas A&M University. However, we are very happy to talk to your veterinarians about your dogs and this infection. Veterinarians with questions can call the Texas A&M GI Laboratory to request a consultation with the consultant on duty for the week. For dogs that are tested through our research surveillance efforts, we will share test results with both the dog owner and the dog's primary care veterinarian. We can provide recommendations for treatment or monitoring directly to the attending veterinarian of each of these dogs but cannot provide this information directly to owners.

10. **Who are you and what are your research goals?**
    Dr. Kate Aicher is a veterinarian, board certified small animal internist, and Assistant Professor at Texas A&M University. Dr. Lea Poellmann is a veterinarian and Post-Doctoral Research Associate here from Germany to lead initial research efforts to determine the prevalence of *Heterobilharzia americana* in dogs. They are both employees of the Texas A&M GI Lab, a lab that does testing for *Heterobilharzia americana* on a fee for testing basis. The proceeds of testing through the Texas A&M GI Lab are reinvested into research efforts to better understand diagnostics and treatment for important gastrointestinal, pancreatic, and liver diseases in dogs and cats.

    As the GI Lab is the only place in the country currently offering the PCR test for *Heterobilharzia americana*, we are uniquely positioned to see the clear trends over the years with the numbers of dogs and regions of the country with infection. Dogs are typically only tested when they are sick and there is high index of suspicion. We are worried that many dogs may never be tested due to low awareness of infection and may even die from a potentially treatable disease. Further, the prevalence of this infection is unknown. It remains unknown if dogs, especially those with high-risk lifestyles (ie-swimming), should be screened regularly for the parasite or if a preventative deworming strategy could be considered.

    We have applied for funding from the AKC-Canine Health Foundation for part of this project and hope to get to partner with them for work in the future to help increase visibility and awareness within the dog owning community. ***Our long-term goal is to reduce the morbidity and mortality of Heterobilharzia americana infection in dogs***. In order to achieve this long-term goal, we have identified key areas of research:

1- Establish the prevalence of infection of high-risk breeds with high-risk lifestyles within an endemic area (Texas)- *research in progress.*
2- Establish the prevalence of infection in other breeds with high-risk lifestyles within an endemic area (Texas)- *research in progress.*
3- Establish a prevalence map in dogs screened for infection across the state of Texas- *research in progress.*
4- Determine utility of screening dogs with high-risk lifestyle for infection presenting to their primary care veterinarian for wellness exams in the state of Texas- *research in progress.*
5- Apply research questions 1-4 above for dogs in all parts of the country- *research in development.*
6- Determine if the current PCR test used for feces can be used to detect the immature life stage of the parasite either in the snail host or contaminated water to be used for screening/testing bodies of water in the future- *research in development.*
7- Establish a cohort of infected dogs to follow over time to better understand outcomes and epidemiology of disease (risk factors for infection, course of disease with and without treatment, rate/risk of reinfection, development of other medical problems secondary to infection with the parasite)- *research in progress.*
8- Establish prospective clinical trials to determine best practice for treatment of infected dogs- *research in development.*
9- Identifying geographic pockets of infection/potential "hot zones" within the country and help raise awareness within the veterinary and dog owning community- *research in development.*

Helpful References/Resources:

Public Health Notification from Dr. Karen Ehnert, DVM, MPVM, DACVPM; Director, Veterinary Public Health; Los Angeles County Department of Public Health concerning outbreak in southern California; April 2023
http://publichealth.lacounty.gov/vet/docs/AHAN/AHAN_Heterobilharzia11dogs_04192023.pdf

Open access article- 2021 Graham et al. Heterobilharzia americana infections in dogs: A retrospective study of 60 cases (2010-2019)
https://doi.org/10.1111/jvim.16127

Open access article- 2021 Cridge et al. Efficacy of a low-dose praziquantel and fenbendazole protocol in the treatment of asymptomatic schistosomiasis in dogs.
https://doi.org/10.1111/jvim.16142

Open access article- 2021 Loker et al. An outbreak of canine schistosomiasis in Utah: Acquisition of a new snail host (Galba humulis) by Heterobilharzia americana, a pathogenic parasite on the move.
https://doi.org/10.1016/j.onehlt.2021.100280

Texas A&M Gastrointestinal Laboratory (Commercial PCR testing on feces for dogs)
https://vetmed.tamu.edu/gilab/service/assays/heterobilharzia-americana/

Not open access but **excellent** review article- 2022 Cook A. Schistosomiasis in the United States. Veterinary Clinics: Small Animal Practice
https://doi.org/10.1016/j.cvsm.2022.06.009